California Regional Water Quality Control Board
North Coast Region

WASTE DISCHARGE REQUIREMENTS
ORDER NO. R1-2008-0099

FOR

SURFACTANT FLUSHING

OF

CONTAMINATED SOIL AND GROUNDWATER

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
Former REDWOOD OIL/CHEVRON BULK PLANT

258 ROSELAND AVENUE
Santa Rosa, California

Sonoma County

The California Regional Water Quality Control Board, North Coast Region (hereinafter the Regional Water Board), finds that:

1. Chevron Environmental Management Company (Chevron) (hereinafter "Discharger") submitted a report of waste discharge (ROWD) on August 6, 2007, October 4, 2007, and April 28, 2008 proposing to conduct surfactant flushing at the former Redwood Oil/Chevron Bulk Plant, located at 258 Roseland Avenue, in Santa Rosa, California (hereinafter "Site"). The Discharger proposes to conduct surfactant flushing activities as an interim remedial action to remove separate phase hydrocarbons from the subsurface soil and groundwater.

2. The Site is located within an unincorporated area within the City of Santa Rosa city limits (Figure 1: Site Location Map). The Site is a developed commercial property, currently occupied by Cal West Transmission. Current land use surrounding the Site includes mixed commercial, industrial, and residential. Previously, the Site was used as a petroleum bulk transfer facility from 1962 until the late 1980's. Bulk storage operations included the storage of gasoline, diesel, aviation fuel, heating oil fuel and Stoddard solvent in both aboveground and underground storage tanks. Soil and groundwater at the Site are contaminated with petroleum hydrocarbons, including gasoline, diesel, benzene, toluene, ethylbenzene, xylene, and methyl tertiary butyl ether (MTBE).

3. The initial report of an unauthorized release of petroleum hydrocarbons at the Site was submitted to the Regional Water Board on April 11, 1990. A total of seventeen groundwater monitoring wells have since been installed; thirty soil borings, and five CPT borings have been advanced to determine the horizontal

and vertical extent of contamination (Figure 2: Site Map). The result of soil and groundwater testing revealed significant soil and groundwater impacts, including the presence of separate phase hydrocarbons. Separate phase hydrocarbon has been reported in five of the Site's monitoring wells, with an historical product thickness measured up to 7.25 feet. The direction of groundwater flow at the site is predominately to the northwest.

4. Limited interim remedial actions have been conducted to recover separate phase hydrocarbons from the subsurface including bailing, pump and treat, and operation of a free product recovery system. Although the thickness of separate phase hydrocarbons has decreased over time, actions have not been successful in complete elimination of separate phase hydrocarbons, as separate phase hydrocarbons continue to be reported in multiple wells.

5. On June 20, 2007, the Regional Water Board issued Cleanup and Abatement Order No. R1-2007-0051. Provision D of the Order required the responsible parties to submit an interim remedial action plan to address removal of remaining sources of contamination. In response, Chevron Environmental Management Company submitted an interim remedial action plan proposing the use of surfactant flushing to remove remaining separate phase hydrocarbons from the subsurface. This interim remedial action is a necessary phase of the cleanup process in order to proceed with a final corrective action plan to address dissolved phase groundwater contamination.

6. Surfactants are a group of chemicals containing alcohols, phosphates, and salts and are frequently used in detergents. By applying surfactant to the subsurface impacted with separate phase hydrocarbons, the surfactant will emulsify and mobilize the separate phase hydrocarbons, thereby allowing successful removal of separate phase hydrocarbons from the Site by extraction.

7. The project applicant proposes to inject surfactant at the site in areas identified with separate phase hydrocarbons. The proposal includes injecting a 2 to 4 percent solution of surfactant diluted with water into existing monitoring wells DHS-8 and MW-2. Approximately 200 gallons of solution will be applied to each well. The solution will equilibrate for approximately 24-48 hours, after which approximately 600 gallons of fluid will be extracted from each well and continue extraction until pre-injection background conditions of surfactant and its by-products are achieved, as demonstrated by the results of one or more parameters identified in paragraph 10 below.

8. The Discharger also proposes to perform surfactant flushing activities in monitoring wells MW-3, MW-5, and MW-10. The nature of subsequent activities will be determined after a full evaluation of all data is collected and reported from initial activities in DHS-8 and MW-2. Based upon the results, adjustments to the character and/or volume of the discharge may be made to ensure optimal results.

Additional injections within the Site that differ from the initial injection areas are authorized under these Waste Discharge Requirements in accordance with the terms and conditions of this Order and in compliance with the complete ROWD.

9. Groundwater monitoring activities are described in Monitoring & Reporting Program Order No. R1-2008-0099. There are four phases of monitoring activities: prior to injections, during injections, during extraction, and post remedial monitoring. Monitoring wells where injection will occur and observation wells will be subject to monitoring. Monitoring at injection points will continue for the duration of the project or until the Executive Officer concurs that water quality conditions of surfactant and its by-products have returned to pre-injection background levels. Monitoring at observation wells will occur if sampling during injection activities indicates the presence of surfactant or significant increase in petroleum hydrocarbons[1].

10. The ROWD reports potential by-products of surfactants will be measured for the following parameters: nitrate as nitrogen, phosphate, sulfate, alkalinity, methane, ferrous iron, pH, conductivity, dissolved oxygen, and oxygen reduction potential. Monitoring of these parameters is also required by Monitoring & Reporting Program Order No. R1-2008-0099.

11. Observation wells will be monitored as part of surfactant flushing activities to monitor possible unwanted migration of surfactant and petroleum hydrocarbons. Details of observation well monitoring requirements are also described in Monitoring and Reporting Program R1-2008-0099. In the event field observations indicate migration of surfactant or hydrocarbons, a migration contingency plan, as set forth in the Report of Waste Discharge, will be implemented to mitigate the effects of unwanted migration. Fluid shall be extracted from any impacted observation well(s) until pre-injection background water quality conditions of surfactant and petroleum hydrocarbons are restored.

12. The proposed interim remedial action is consistent with the antidegradation provisions of the State Water Resources Control Board Resolution No. 68-16. Soil flushing is designed to remove separate phase hydrocarbons from the subsurface conducted as an interim step to ultimately restore the beneficial uses of groundwater.

13. The Regional Water Board's Water Quality Control Plan for the North Coast Region includes water quality objectives and receiving water limitations.

[1] Significant increase will be determined by the Executive Officer and will generally involve a higher level of exceedance of the water quality objectives or increased threat to the beneficial uses of water.

14. Beneficial uses of groundwater include: municipal and domestic water supply, industrial water supply, industrial process water supply, and agricultural water supply as identified in the Water Quality Control Plan for the North Coast Region.

15. The Regional Water Board is the lead agency for this project under the California Environmental Quality Act (Pub. Resources Code, section 21000 et seq.) (CEQA). An Initial Study/Checklist and Mitigated Negative Declaration were prepared in accordance with title 14, California Code of Regulations, section 15063. On August 13, 2008, the Regional Water Board provided notice of intent to adopt a Mitigated Negative Declaration (SCH No.XXXXXXXXXX) for the project. (California Code of Regulations, title 14, § 15072.) The Mitigated Negative Declaration reflects the Regional Water Board's independent judgment and analysis.

16. After considering the Initial Study/Checklist and other documents and comments received during the public review process, the Regional Water Board hereby determines that the proposed project with mitigation measures, will not have a significant effect on the environment. Mitigation measures are incorporated as a condition of this Order. The Mitigated Negative Declaration is hereby adopted. The documents or other material, which constitute the record, are located at the Regional Water Board office located at 5550 Skylane Blvd., Santa Rosa, California. The Regional Water Board will file a Notice of Determination within five days from the issuance of this Order.

17. The Regional Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity to submit written comments and recommendations.

18. The Regional Water Board, at a public meeting on October 23, 2008, heard and considered all comments pertaining to the discharge.

THEREFORE, IT IS HEREBY ORDERED that the Discharger, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, shall comply with the following:

A) DISCHARGE PROHIBITIONS

1. Creation of a pollution, contamination, or nuisance, as defined by Water Code section 13050, subdivision (m), is prohibited (Health and Safety Code, section 5411).

2. The discharge of treatment additives to land, surface water, or to groundwater in areas other than approved for interim remedial actions by this Order is prohibited.

3. The discharge of any waste not specifically regulated by this Order is prohibited.

B) **DISCHARGE SPECIFICATIONS**

1. The addition of surfactant to the subsurface shall not impart taste, odor, or color to, or otherwise degrade the beneficial use of areal groundwater, except for temporary changes within the proposed treatment area.

2. The addition of surfactant to the subsurface shall not impart taste, odor, or color to or otherwise degrade the beneficial uses of areal groundwater beyond the boundaries of the property owned or controlled by the Dischargers.

3. The soil flushing activities and surfactant extraction activities in the proposed areas shall be conducted as described in the August 6, 2007 *Interim Remedial Action Work Plan*, the October 1, 2007 *Interim Remedial Action Work Plan Addendum*, and the April 24, 2008 *Additional Information for Report of Waste Discharge*. Extraction activities shall commence within 48 hours of surfactant injection. Before surfactant flushing activities in monitoring wells MW-3, MW-5, MW-10, or other proposed areas at the Site may be conducted, the following items shall be submitted: a) a workplan proposal to the Executive Officer for review and concurrence, b) a proposed groundwater monitoring program; and c) a revised contingency plan. If the Executive Officer finds no new significant impacts or issues, the Executive Officer may concur with the proposal, including issuing a revised monitoring and reporting program. The discharger may then conduct additional injections in accordance with the terms of this Order.

4. The unwanted migration of surfactant or petroleum hydrocarbons shall be mitigated as specified in the migration contingency plan immediately upon detection. The Discharger shall immediately notify the Executive Officer of any intent to implement the contingency plan.

5. When the interim remedial action is completed, surfactant and by-product measurements shall not exceed pre-injection (background) concentrations within or outside the treatment area.

C) **PROVISIONS**

1. A copy of this Order shall be available at all times to operating personnel.

2. The Discharge shall comply with all requirements, conditions and provisions set forth in Monitoring and Reporting Program Order No. R1-2008-0099. The Executive Officer of the Regional Water Board retains discretion to modify provisions of the Monitoring and Reporting Program.

3. The Discharger shall comply with all mitigation measures identified in the Mitigated Negative Declaration titled “Chevron Environmental Management Company, former Redwood Oil/Chevron Bulk Plant, Surfactant Flushing.” The Discharger shall implement the project as described in this Order. Violation of any requirements of this Order, the Mitigated Negative Declaration or the

Monitoring and Reporting Program subject the Discharger to enforcement action, including civil liability, under the Water Code.

4. The Discharger shall submit an interim remedial system summary report within 90 days of completed field activities. The report shall document surfactant flushing field activities, including pre-injection data, data collected during injection activities, and data collected during extraction activities.

5. Severability

   Provisions of these waste discharge requirements are severable. If any provision of these requirements is found invalid, the remainder of the requirements shall not be affected.

6. Operation and Maintenance

   The Discharger must maintain in good working order and operate as efficiently as possible, any facility or control system installed by the discharger to achieve compliance with the waste discharge requirements.

7. Storage, Transportation and Handling of Materials

   Surfactant and all waste generated must be properly stored, transported, disposed, and handled during the entire duration of the project.

8. Change in Ownership

   In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the discharger, the discharger must notify the succeeding owner or operator of the following items by letter, in advance of the transfer of ownership or control, and a copy of the notice must be forwarded to the Regional Water Board:

   a. existence of this Order, and
   b. the status of the Dischargers' annual fee account.

9. Vested Rights

   This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, nor protect the Discharger from his liability under federal, state, or local laws, nor create a vested right for the Discharger to continue waste discharge.

10. Monitoring

The Discharger must comply with the Contingency Planning and Notification Requirements Order No. 74-151 and Monitoring and Reporting Program R1-2008-0099 and any modifications to this document as specified by the Executive Officer. Such documents are attached to this Order and incorporated herein:

a. Order No. 74-151 requires immediate incident reporting of unintentional or accidental spills (including emergency response actions) and diligent action to abate the effects of the discharge. Written confirmation of the incident is required within two weeks of notification.
b. General Monitoring and Reporting Provisions require sampling and analysis performance criteria in addition to compliance reporting criteria and time frames.

11. Inspections

The Discharger shall permit authorized staff of the Regional Water Board:

a. entry upon premises where injection is being conducted or in which any required records are kept;
b. access to copy any records required to be kept under terms and conditions of this Order;
c. inspection of monitoring equipment or records; and
d. sampling of any discharge.

12. Noncompliance

In the event the Discharger is unable to comply with any of the terms, prohibitions, provisions, and conditions of this Order, including prohibiting the migration of surfactant or contaminants, due to:

a. breakdown of equipment;
b. accidents caused by human error or negligence; or
c. other causes such as acts of nature;

The Discharger shall notify the Executive Officer by telephone as soon as he or she has knowledge of the incident, and shall confirm this notification in writing within two weeks of the telephone notification. The written notification shall include pertinent information explaining reasons for the noncompliance and shall indicate the steps taken to correct the problem and the dates thereof, and the steps being taken to prevent the problems from recurring.

13. Significant Changes in Discharge

    The Discharger shall notify the Regional Water Board before making any significant change or proposed change in the character, location, or volume of the discharge. The Discharger shall file a report of Waste Discharge, and a new order is required for any significant changes.

Certification

I, Catherine Kuhlman, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, North Coast Region, on October 23, 2008.

_____

Catherine Kuhlman
Executive Officer

08_0099_WDR_ROBP_CHH_081108

References

Consetoga-Rovers, August 6, 2007 *Interim Remedial Action Plan*,

Consetoga-Rovers, October 1, 2007, *Interim Remedial Action Plan Addendum*.

Consetoga-Rovers, April 24, 2008 *Additional Information for Report of Waste Discharge*.

ITRC (Interstate Technology & Regulatory Council). 2003. *Technical and Regulatory Guidance for Surfactant/Cosolvent Flushing of DNAPL Source Zones*. DNAPLs-3. Washington, D.C.: Interstate Technology & Regulatory Council, DNAPLs Team. Available on the Internet at www.itrcweb.org.

Jafvert, Chad T. PhD., December 1996, *Surfactants/Cosolvents: Technology Elvations Report.* Groundwater Remediation Technologies Analysis Center, Purdue University.

Strbak, Lauryn, July 2000, *In Situ Flushing with Surfactants and Cosolvents*. National Network of Environmental Management Studies Fellow. Washington D.C..

US EPA, September 1996, How to Effectively Recover Free Product at Leaking Underground Storage Tank Sites. Washington D.C.

US EPA, May 2001, *A Citizen's Guide to In Situ Flushing,*

List of Figures

Figure 1: Site Location Map
Figure 2: Site Map